

PROCEEDINGS
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FIVE NEW RODENTS FROM ARIZONA AND NEW MEXICO.

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In revising the squirrels of Mexico and Central America, Nelson (Proc. Washington Acad. Sci., vol. 1, p. 94, May 9, 1899) included the Chiricahua Mountains, Arizona, in the range of *Sciurus apache*, apparently on the basis of a single specimen then available. Study of the series accumulated in recent years, however, reveals distinguishing characters for this isolated northern colony. My thanks are due to Mr. H. E. Anthony, Curator of Mammals, American Museum of Natural History, for his kindness in loaning the type of *S. apache* for comparison.

The type of *Thomomys chrysonotus* Grinnell, from Ehrenberg, Arizona, remained unique until 1931 when a fine series of specimens from at or very near the type locality was taken by George Willett for the Los Angeles Museum. Eight of these specimens, delineating the general range of individual variation, renders it possible to determine more definitely the relationship of *chrysonotus* to neighboring forms. As a result specimens from the desert plains of southwestern Arizona, hitherto assigned to *chrysonotus*, are found to be quite different, and a single example from the Harquahala Mountains presents characters that appear to be quite distinctive. Four new subspecies of *Thomomys* are here described. For the privilege of studying the topotypes of *chrysonotus* I am much indebted to Mr. Willett.

***Sciurus chiricahuae*, sp. nov.**

CHIRICAHUA MOUNTAIN SQUIRREL.

Type.—From Cave Creek, Chiricahua Mountains, Cochise County, Arizona (altitude 5,200 feet). No. 244124, ♀ adult, skin and skull, U. S.

National Museum (Biological Survey collection), collected by E. A. Goldman, August 16, 1923. Original number 23527.

Distribution.—Known only from the Chiricahua Mountains, Arizona.

General characters.—A vividly colored species, with tawny thighs and forearms contrasting strongly with grizzled back. Closely allied to *Sciurus apache* of the Sierra Madre of Mexico, but color richer, more intense, the fore-limbs, under parts, orbital rings and post-auricular patches near tawny instead of ochraceous buff; cranium more evenly arched in upper outline, the frontal region less flattened anteriorly as viewed from the side.

Color.—*Type* (summer pelage): General dorsal area from top of head to rump a nearly uniform mixture of light ochraceous buff and black producing a grizzled effect, extending well down to a sharp line of demarcation on lower part of sides; limbs and under parts near pure light tawny, contrasting strongly with grizzled general body color; orbital rings, post-auricular patches, tip of nose and lips light tawny like under parts; tail above ochraceous buff mixed with black, the individual hairs tricolored, ochraceous buff at base, black on median third, becoming abruptly lighter ochraceous buff toward tips; tail below light tawny along broad median line, interrupted by a black zone giving way to broad, light ochraceous buffy marginal areas. In some specimens the outer sides of the thighs are deeper tawny than in the type.

Skull.—Very similar to that of *S. apache*, but shorter and relatively slightly broader; frontal profile more convex across anterior roots of zygomatica, giving the cranium a more evenly arched upper outline as viewed from the side; nasals shorter, broader anteriorly, the anterior nares opening more widely; dentition about the same.

Measurements.—*Type*: Total length, 552 mm.; tail vertebrae, 275; hind foot (c. u.), 75. Average of ten adults (including type) from Chiricahua Mountains (5,200–9,000 feet); 544 (530–552); 264 (250–275); 75.5 (73–80).

Skull (type).—Greatest length, 63.7; condylobasal length, 58; zygomatic breadth, 38.2; interorbital constriction, 21.5; length of nasals, 21.5; greatest width of nasals anteriorly, 9.8; maxillary toothrow (alveoli), 11.7.

Remarks.—*Sciurus chiricahuae* and *S. apache* are obviously very closely allied, but the differences pointed out appear to be trenchant, and in view of their geographic separation by intervening desert plains the two may be treated as specifically distinct. Specimens from the San Luis Mountains, a northern spur of the Sierra Madre extending across the Mexican Boundary in southwestern New Mexico, are referable to *apache*. Comparison has been made with 38 specimens of *apache* from various localities within its range, which extends southward at least to El Salto, southern Durango.

Specimens examined.—Eleven, all from the Chiricahua Mountains, Arizona.

***Thomomys fulvus phasma*, subsp. nov.**

TULE DESERT POCKET GOPHER.

Type.—From two miles south of Tule Tank, Tule Desert, near Mexican Boundary, Yuma County, Arizona. No. 203026, ♀ adult, skin and skull,

U. S. National Museum (Biological Survey collection), collected by E. A. Goldman, December 8, 1913. Original number 22355.

Distribution.—Lower part of Gila River Valley and desert region of southwestern Arizona, from the Colorado River east at least to Quitobaquito, ranging south into northwestern Sonora.

General characters.—One of the palest of the known forms of the genus. Closely allied to and in color about like *Thomomys perpallidus albatrus* of the western side of the Colorado River in California, but smaller and cranial characters distinctive. Similar to *Thomomys fulvus chrysonotus* of the eastern side of the Colorado River Valley near Ehrenberg, Arizona, but paler, less yellowish, and audital bullae decidedly smaller. Differing from *Thomomys fulvus cervinus* and *Thomomys fulvus modicus*, its geographic neighbors on the east, by pallid coloration and combination of skull characters.

Color.—*Type* (acquiring summer pelage): Upper parts between pale pinkish buff and pinkish buff (Ridgway, 1912), scarcely modified by dark-tipped hairs, except for a fine admixture on face, top of head, and median dorsal area, passing gradually into white along lower part of sides; under parts overlaid with white, the light plumbeous basal color showing through except on chin and inner sides of forearms; muzzle dusky; ears blackish; black post-auricular spots small; limbs and tail white. In some specimens the black post-auricular spots are scarcely discernible and the under parts are nearly pure white to roots of hairs. One example from Tule Wells, near the type locality is darker, or more pinkish buff than usual, while another from the same place and in the same winter pelage exhibits the pallor normal in the subspecies.

Skull.—Closely resembling that of *T. p. albatrus*, but smaller, less angular, more smoothly rounded; braincase usually narrower; upper outline more evenly curved as viewed from the side (tending to bulge upward more prominently across anterior roots of zygomatics in the older adults of both sexes in *albatrus*); nasals shorter; incisors narrower. Smaller than that of *T. f. chrysonotus*, with shorter nasals; bullae smaller, less bulging below level of basioccipital; incisors much narrower. Still more decidedly smaller than that of *T. f. cervinus*, and differing otherwise in about the same characters as from *chrysonotus*, except the audital bullae which are relatively about the same. Compared with that of *T. f. modicus* the skull is relatively shorter, broader, and more flattened; nasals shorter; audital bullae similar; incisors slightly narrower.

Measurements.—*Type*: Total length, 199; tail vertebrae, 66; hind foot (c. u.), 29. An adult female topotype: 195; 68; 29.5. *Skull* (type): Condylbasal length, 34.1; zygomatic breadth, 22; greatest breadth across squamosals (over mastoids), 18.9; interorbital constriction, 6.3; length of nasals, 11; maxillary toothrow (alveoli), 7.7; width of upper incisors (cutting edge), 3.8.

Remarks.—In describing new pocket gophers from Arizona (Journ. Washington Acad. Sci., vol. 21, no. 17, pp. 416–417, Oct. 19, 1931), I pointed out the close affinity of the pocket gophers inhabiting the eastern and western sides of the lower course of the Colorado River. This was

regarded as due to the shifting channels and the probable transfer of colonies from one side to the other from time to time. While animals from near the delta on the opposing sides are nearly identical in color and differ only slightly in combination of cranial characters progressive divergence is shown in series from more distant points. Specimens from Quitobaquito are darker and apparently grade toward *modicus* in color, but the skulls are about like those of typical *phasma*.

Specimens examined.—Total number, 38, as follows:

Arizona: Colorado River (at Mexican Boundary Monument 204), 1; Gadsden, 7; Somerton, 1; Quitobaquito, 2; Taena, 1; Tule Tank (type locality), 3; Tule Well (near type locality), 2; Yuma, 11; Yuma (18 miles south), 7.

Sonora: Cienega Well (30 miles south of Monument 204), 2; Colorado River (20 miles south of Mexican Boundary), 1 (skull only).

***Thomomys fulvus subsimilis*, subsp. nov.**

HARQUAHALA MOUNTAIN POCKET GOPHER.

Type.—From Harquahala Mountains, Yuma County, Arizona (altitude 3,000 feet). No. 227803, ♀ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by E. A. Goldman, October 14, 1917. Original number 23356.

Distribution.—Known only from the Harquahala Mountains, but may inhabit other desert ranges of western Arizona.

General characters.—A very small, rather pale form with a weakly-developed skull. Most closely allied to *Thomomys fulvus desertorum* of the Detrital Valley region of northwestern Arizona, but smaller and paler, more cinnamon buffy (near tawny or ochraceous tawny) in *desertorum*, with a more slender skull. Much smaller and paler than *T. f. fulvus* of San Francisco Mountain. Darker and contrasting strongly in delicate structure with its geographic neighbors, *T. f. chrysonotus* and *T. f. flavidus*, of the Colorado River Valley.

Color.—*Type* (acquiring fresh pelage): Upper parts near cinnamon brown, purest on cheeks, shoulders, and sides, finely and rather inconspicuously mixed with black along median dorsal area; small patches of worn pelage on posterior part of back near cinnamon in tone; face and top of head darker, the dusky hairs more numerous; under parts, forearms, and thighs pinkish buff; muzzle dusky; ears and small post-auricular areas deep black; feet and tail whitish.

Skull.—Small, slender and delicate in structure, with a narrow but high and rounded braincase. Rather closely resembling those of *T. f. fulvus*, and *T. f. desertorum* but smaller, with a narrower, relatively more highly arched, more smoothly rounded braincase; zygomata more slender, almost thread-like; audital bullae rather small, but fully inflated as in *desertorum*; dentition light. The skull is similar to those of *T. f. chrysonotus* and *T. f. flavidus* in general form, but differs so widely in diminutive size that close comparison is not required.

Measurements.—*Type*: Total length, 183; tail vertebrae, 60; hind foot

(c. u.), 25. *Skull* (type): Condylbasal length, 30.8; zygomatic breadth, 19.2; greatest breadth across squamosals (over mastoids), 16; interorbital constriction, 6.5; length of nasals, 10.2; maxillary toothrow (alveoli), 6.8; width of upper incisors (cutting edge), 3.2

Remarks.—With some hesitation a new subspecies is proposed on the basis of a single female specimen. The characters presented, however, appear to be well beyond the range of individual variation in the neighboring forms, and adult males may be expected to reveal more distinctive features. The new form may prove to have an extensive range in the desert mountains of the general region.

***Thomomys fulvus mutabilis*, subsp. nov.**

VERDE VALLEY POCKET GOPHER.

Type.—From Camp Verde, Yavapai County, Arizona (altitude 3,200 feet). No. 214611, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by Walter P. Taylor, July 25, 1916. Original number 269.

Distribution.—Valleys and lower slopes of mountains in the Gila River drainage along the southern side of the Mogollon Plateau, Arizona, ranging mainly in Lower Sonoran Zone.

General characters.—A medium-sized, cinnamon buffy subspecies. Closely allied to *Thomomys fulvus fulvus* of San Francisco Mountain, Arizona, but color distinctly more cinnamon buffy, instead of cinnamon (Ridgway, 1912), the upper parts less mixed with black, and skull more massive. Probably intergrading with *T. f. cervinus* of the Salt River Valley near Phoenix, but smaller and color rich cinnamon buff, instead of dull pinkish buff. Similar in color to *T. f. desertorum* of Detrital Valley, northwestern Arizona, but usually darker, and skull larger, more massive. Differing from *T. f. toltecus* of northwestern Chihuahua mainly in smaller, less massive skull; color usually somewhat brighter, more cinnamon buffy.

Color.—*Type* (acquiring fresh pelage): Upper parts near cinnamon buff with a light tawny admixture, purest along sides, the top of head and median dorsal area somewhat obscured by dark-tipped hairs; muzzle blackish; ears and small but sharply defined post-auricular areas deep black; under parts, forearms, and thighs cinnamon buff; feet whitish; tail light brownish above on basal two-thirds, lighter below, becoming whitish all around toward tip. Topotypes varying in tone from cinnamon buff to near tawny.

Skull.—Very similar to that of *T. f. fulvus* but heavier; basicranial region usually decidedly broader; audital bullae larger. Resembling that of *T. f. desertorum*, but larger and more massive. Similar to those of *T. f. cervinus* and *T. f. toltecus*, but smaller than either, with relatively smaller audital bullae.

Measurements.—*Type*: Total length, 236; tail vertebrae, 71; hind foot, 31. Average of seven adult female topotypes: 216 (203–228); 68 (64–73); 29 (27.5–30.5). *Skull* (type): Condylbasal length, 41.2; zygomatic breadth, 26.4; greatest breadth across squamosals (over mastoids), 20.3;

interorbital constriction, 6.5; length of nasals, 14.4; maxillary toothrow (alveoli), 8.8.

Remarks.—*Thomomys f. mutabilis* ranges in the valleys and along the lower southern slopes of the Mogollon Plateau from the Verde River east to near the New Mexican Boundary. Specimens vary slightly from locality to locality, as usual in the group. The region of the type locality is intermediate in geographic position and specimens from it tend to bridge the gap between *T. f. fulvus* and *T. f. cervinus*, but differ too widely to be properly referred to either. Specimens from Safford in the upper part of the Gila River Valley are somewhat larger and apparently grade toward *T. f. toltecus*.

Specimens examined.—Total number, 44, all from Arizona as follows: Camp Verde (type locality), 21; Cazador Spring (south base of Nantan Plateau), 1; H-bar Ranch (10 miles south of Payson), 2; Montezuma Well (near Camp Verde), 3; Rice, 6; Safford, 9; Turkey Creek, Yavapai County, 2.

***Thomomys fulvus emotus*, subsp. nov.**

ANIMAS MOUNTAIN POCKET GOPHER.

Type.—From Animas Peak, Animas Mountains, Hidalgo County, southwestern New Mexico (altitude 8,000 feet). No. 157005, ♂ adult, skin and skull, U. S. National Museum (Biological Survey collection), collected by E. A. Goldman, August 3, 1908. Original number 19929.

Distribution.—Known only from the upper slopes (7,000–8,000 feet) of the Animas Mountains, New Mexico.

General characters.—A small, dark brown subspecies, with a short, broad skull; upper incisors curving directly downward (not projecting forward beyond anterior plane of nasals). Similar to *Thomomys fulvus collinus* of the Chiricahua Mountains but smaller and color darker cinnamon; skull smaller and differing in detail. Closely resembling *Thomomys fulvus intermedius* of the Huachuca Mountains, and *Thomomys burti* of the Santa Rita Mountains but color brighter, more uniform cinnamon brownish, without a well-defined black median dorsal area, and skull shorter than in either. Differing from *Thomomys mearnsi* of the Animas Valley and lower slopes of the Animas Mountains, in decidedly darker color and cranial details, especially the more strongly decurved upper incisors.

Color.—*Type* (worn summer pelage): Upper parts near cinnamon brown (Ridgway, 1912), somewhat lighter, and nearer cinnamon along lower part of sides; middle of back dusky, owing apparently to wearing away of cinnamon brown tips of hairs; muzzle, face, and top of head blackish; under parts overlaid with cinnamon, the under color of pelage dark plumbeous nearly everywhere; a small, irregular, pure white spot (without special significance) on middle of breast, and one on each wrist; ears and auricular spots deep black; forearms and thighs cinnamon; feet and tail dull whitish. A topotype is nearly identical in color.

Skull.—Cranium small, short, and light in structure, with strongly decurved upper incisors. Similar to that of *T. c. collinus*, but decidedly smaller, less angular; braincase more smoothly rounded; temporal ridges

more widely separated and lambdoid crest less prominent in mature males; interorbital region less constricted; dentition rather light; upper incisors more decurved than in the type of *collinus*. Differing from that of *T. mearnsi* in about the same characters as from *collinus*, except that the upper incisors contrast still more markedly in directly downward curvature (upper incisors inclined strongly forward and projecting beyond anterior plane of nasals in *mearnsi*). Approaching in size and closely resembling that of the geographically isolated form, *T. burti*, but somewhat shorter and slightly flatter, the upper outline apparently straighter; rostrum slightly shallower; nasals narrow and deeply emarginate posteriorly as in *burti*, and dentition about the same.

Measurements.—*Type*: Total length, 202; tail vertebrae, 60; hind foot, 26. An adult male topotype: 197; 55; 27. *Skull* (type): Condylobasal length, 34.6; zygomatic breadth anteriorly (zygoma broken posteriorly), 21.2; greatest breadth across squamosals (over mastoids), 17.5; interorbital constriction, 7.2; length of nasals, 12.5; maxillary toothrow (alveoli), 7.2; width of upper incisors (cutting edge), 4.

Remarks.—Specimens of the present form were assigned by Bailey (North Amer. Fauna, no. 39, p. 85, Nov. 15, 1915) to *T. f. intermedius*. The collection of additional material in southern Arizona has, however, indicated that *intermedius* must be accorded a more restricted range, and that several closely allied forms inhabiting the upper slopes of high mountains in the general region present distinctive characters and warrant separate recognition. Intergradation with *T. mearnsi*, which occurs from 5,000 feet on the open plains of Animas Valley up to 5,800 feet on the lower slopes of the Animas Range, is not definitely shown but is strongly suggested by general comparisons.

Specimens examined.—Three (including type), all from near the top of the Animas Mountains, New Mexico.